START

FINAL MEETING MINUTES Environmental Restoration Storage and Disposal Facility (ERSDF)

May 11, 1993 9:00 EPA Conference Room, 712 Swift Blvd

1. ACTION ITEM STATUS:

ERSDF-3 Moses Jaraysi Draft a list of suggested items to go into the letter from RL as a response to the CAMU letter coming from the regulators. Open 4/27/93. Status Unchanged, 5/11/93.

ERSDF-4 Merl Lauterbach Prepare a detailed outline of the "package" that will be used for the CAMU application. The package should include a summary of the approach to satisfying the criteria specified in 40 CFR 264.552(c) and information on the proposed design options for the units. Annotated outline for permit modification to be presented 5/11/93. Closed 5/11/93.

ERSDF-5 Bryan Foley DOE is to formally transmit the Site Evaluation Report for the ERSDF to the regulators. In DOE concurrence, 4/27/93. Closed 5/11/93.

ERSDF-6 Vernon Dronen Westinghouse will outline the "barriers" to the use of the W-5 facility for disposal of past practice waste. Open, 4/27/93. Closed 5/11/93.

ERSDF-7 Mel Adams At the May 11 meeting, WHC will present a matrix of different waste form and containment technology options with selected model applications. The goal of the modeling effort is to compare the effectiveness of treatment and disposal options within the framework of varying compliance criteria cases. Closed 5/11/93.

2. ACTION ITEMS ASSIGNED AT THIS MEETING:

ERSDF-8 Pam Innis Rich Hibbard Comments were requested of both EPA and Ecology on the annotated outline which covers application of CAMU for the ERSDF.

ERSDF-9 Pam Innis Ted Wooley Comments were requested of both EPA and Ecology with regard to the ERSDF Treatment Engineering Screening Exercise.

3. INFORMATION ITEMS:

 Connie Walker presented the general outline that defines items to be addressed in the CAMU application. The package included a summary of the approach satisfying criteria specified in 40 CFR 264.552(c) and an outline of the engineering design study (see attachment #1).

- Mel Adams presented a matrix of different waste form and containment technology options with selected model applications. The goal of the modeling effort is to compare the effectiveness of treatment and disposal options within the framework of varying compliance criteria cases (see attachment #2).
- Pam Innis stated that the formal letter from the regulators to DOE concerning implementation strategy for the CAMU is anticipated to be available by the last week of May.
- Vern Dronen reported on the constraints that the ER program might impose on the construction of the W-O25, RMW Land Disposal Facility and the constraints that W-O25 might impose on the ER Operations.

The intent is to construct W-025 as designed and either containerize the waste prior to disposal or revisit the permit to allow for bulk disposal.

- <u>Siting Study:</u> A formal transmittal letter to the regulators was completed on April 27, 1993. EPA received the letter on May 3 and noted that comments would be to DOE by the end of the month.
- <u>Negotiations Between DOE and Ecology:</u> DOE counsel has prepared a formal letter requesting that negotiations be initiated concerning transfer/ exchange of state leased land.
- The next meeting is scheduled for 9:00 a.m. on May 25th in the EPA conference room, 712 Swift Blvd - Suite 5.

4. POSSIBLE AGENDA ITEMS FOR THE MAY 25 MEETING

- Discussion of ERSDF letter from EPA and Ecology.
- Update Status of CAMU outline.
- Update Status of preliminary modeling results for different disposal scenarios.
- Status of Negotiations with Ecology for Lease Land by DOE Legal.

ATTACHMENT

DRAFT:FOR DISCUSSION PURPOSES ONLY

OUTLINE

CORRECTIVE ACTION MANAGEMENT UNIT (CAMU)

PERMIT MODIFICATION REQUEST FOR THE ERSDF

I. Permit Modification Request (40 CFR 270.42(c))

- Include a description of the exact change requested (including a brief background discussion) for the permit and list of additional documentation (attached/included in the modification request) in support of the request;
- State specifically that a Class 3 permit modification is being requested;
- Provide a summary explanation of why the modification is sought/needed; and

A. Organization of the Permit Modification Request

- Discuss required information under 270.13-21 and 264.552 that must be included/addressed in the request, and where (via matrix or table format) this information can be found within the request. A section-by-section summary of request contents will also be included.

II. CAMU Description and Environmental Setting

A. Facility Description and Location

- Provide, specifically, a discussion of the CAMUs' areal configuration, including facility lay-out, physical dimensions of the unit, and location map;
- Provide a general description of the ERSDF; and
- Discuss siting decisions/other location information, including demographics.

B. Environmental Setting

1. Background: the Hanford Region

- Introduce location of the unit relative to population centers, etc.;

- Discuss ecological setting; and
- Present meteorologic information pertinent to local climate including rainfall, ambient temperature variations, atmospheric/air quality assessments (wind direction, velocity, etc).

2. 200 Area Geology*

- Provide a generalized summary of the area geology, referencing attachments which provide further detail;
- Discuss site geology, including stratigraphy/hydrostratigraphy and structural and topographic features unique to the 200 (ERSDF) area;
- Discuss surficial (soil) material including the vadose zone; and
- Discuss vadose zone characteristics including thickness, etc.

3. 200 Area Hydrology: Surface Water and Groundwater*

- a. Surface Water Hydrology
- Provide background information on site-wide surface water features, but focus on floodplain information and surface water features as they relate to the 200 (ERSDF) area, and
- Discuss surface water infiltration rates.
- b. Ground-Water Hydrology
- Discuss ground-water modeling results, as applicable, relative to flow; referencing types of models used, etc., and
- Discuss principal aquifers/water-bearing intervals at Hanford and, in more detail, within the 200 area, identify the location of current ground water monitoring wells including completion data, and:
- Depth to groundwater;
- Ground-water flow direction, rate/velocity;
- Aquifer interconnection(s);

- Aquifer characteristics (physical and chemical); and
- "Background" ground-water quality, including contaminant distribution (plume) maps of pre-existing contamination, as applicable.

III. Wastes to be Managed at the CAMU

A. Waste Characteristics

- General description of anticipated remediation wastes, including chemical composition, volume, and physical nature of the wastes;
- Discuss any treatment(s)* wastes will have undergone prior to disposal in the CAMU. While it is very likely that treatments will be operable-unit specific, a "category"-type treatment discussion may be possible;.
- Discuss the LDR exemption as it pertains to the CAMU, and how proposed treatment/characterization addresses the intent of the CAMU regulation; and
- Include the Waste Analysis Plan for wastes to be accepted at the CAMU, as applicable.

IV. CAMU Design and Operation

A. Unit Design(s)

- Provide detailed design(s) of the CAMU, referencing drawings in attachments, etc., and
- Discuss why the design(s) has been chosen, referencing/summarizing alternatives examined under the RI/FS (RFI/CMS) process and discussed in the Attachment C.

B. Unit Operation

- Summarize how the wastes will be transferred to the unit(s);

- Discuss how the unit(s) will be maintained during the operational phase, including any tent structures/enclosures or partial/full covers applied to the unit areas;
- Include any specific procedures to prevent hazards/and discuss applicable portions of the Contingency Plan (the Contingency Plan could require modification to include the unit, and modifications could be included as an attachment); and
- Summarize the "risk" associated with operation of the facility, and how nominal risk will be attained through proper procedures, contingency plan implementation, etc. If required, discuss quantitative risk data relative to contaminant migration during the operational phase.

V. Ground-Water Monitoring Requirements

- Briefly reiterate pertinent site hydrogeologic considerations, then present the proposed monitoring system for the CAMU, and
- Describe CAMU-specific monitoring for the operational period, using as many preexisting wells as possible. These could double as post-closure monitoring wells.

A. Proposed Ground-Water Monitoring System

- 1. Well Location
- 2. Well Depth
- 3. Screen Intervals
- 4. Sampling Methods, Frequencies and Analytical Suites
- 5. "Background" Ground-Water Quality.
- 6. Rationale for Proposed Groundwater Monitoring System

VI. Closure/Post-Closure Information Requirements

A. Unit Closure

1. Closure Design

- Present cap design(s) (as determined in Attachments C and D), and
- Discuss what the proposed closure design for the unit will achieve relative to CAMU objectives and criteria.

2. Wastes Present at Closure

- Discuss total volume and anticipated waste characteristics of ER wastes expected at closure.

3. Schedule for Closure

- Indicate whether progressive closure of cells is planned, etc.

4. Closure Activities and Procedures

- Detail specific closure design for unit, and
- Summarize reference supporting documentation

B. Post Closure Ground-Water Monitoring Plan

- Summarize proposed ground-water monitoring, based upon detection monitoring requirements.

1. Well Location and Description

- Monitoring well locations;
- Monitoring well depths; and
- Screened intervals and completion information.

2. Sampling Procedures, Frequencies and Analytical Suites

- Include sample collection information (procedures, etc.) as well as analytical procedures/methods, chain of custody, how ground-water elevation/flow direction will be determined, etc.

3. Statistical Analyses

- Provide, is necessary, with data evaluation methodologies.
- 4. Background Ground-Water Monitoring

VII. Information to Support CAMU Designation: CAMU Evaluation Criteria*

A. CAMU Criteria

- Each of the individual CAMU criteria should be discussed, with brief summaries of the information presented in the Attachment D.

1. CAMU Criteria 1

- The CAMU shall facilitate the implementation of reliable, effective, protective and cost-effective remedies. This may be demonstrated by discussing:
 - Site environmental conditions;
 - Unit design, operation and management;
 - Closure/post closure design;
 - "Risk" assessment results relative to operation of the unit;
 - Contaminant transport modeling results;
 - Cost-effectiveness of unit relative to other designs; and
 - Other elements which support this criteria (i.e. treatment).

2. CAMU Criteria 2

- Waste management activities associated with the CAMU shall not create unacceptable risks to humans or to the environment resulting from exposure to hazardous wastes or hazardous constituents. This may be demonstrated by discussing:
 - "Risk assessment"* relative to operation/closure of the unit. Should not be a quantitative, but qualitative assessment integrating site environmental conditions, etc., and is not the same risk assessment performed via ground-water modeling, and
 - May also include the procedures to prevent hazards/contingency plan information, as applicable.

3. CAMU Criteria 3

- The CAMU shall include uncontaminated areas of the facility only if including such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility. This may be demonstrated by discussing:
 - Results of siting reports (as applicable) or other studies to determine the proposed CAMU location, which included evaluation of site location alternatives;
 - Consequences of collecting waste in one central area rather than leaving it in several locations throughout the facility; and
 - Unit design/operation, closure/post-closure considerations which may mitigate contaminant migration, including treatment.

4. CAMU Criteria 4

- Areas within the CAMU, where wastes remain in place after closure of the CAMU, shall be managed and contained so as to minimize future releases to the extent practicable. This may be demonstrated by discussing:
 - Closure/post closure plan, and
 - Contaminant transport modeling results.

5. CAMU Criteria 5

- The CAMU shall expedite the timing or remedial activity implementation, when appropriate and practicable. This may be demonstrated by discussing:
 - Remediation schedule, comparing how this schedule would be impacted if the CAMU were not implemented.

6. CAMU Criteria 6

- The CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU. This may be demonstrated by discussing:
 - Any generalized treatment (category) performed on waste prior to emplacement, and subsequent reduction in toxicity, mobility and/or volume; alternatively, if treatment is not required/performed, discuss in detail why this is equally protective, and
 - Treatment alternatives examined, including relative cost of alternatives*.

7. CAMU Criteria 7

- The CAMU shall, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the permit. This will be demonstrated by discussing:
 - Siting decisions, unit size, and closure considerations;
 - Size of the facility relative to size of contaminated soil area if waste remained in place; and
 - How consolidation of wastes (into) one location minimizes contaminated land area.

VIII. Conclusion

- A. Evaluation of Proposed CAMU Suitability Relative to CAMU Designation Criteria
- * May reference/summarize attachments

6. CAMU Criteria 6

- The CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU. This may be demonstrated by discussing:
 - Any generalized treatment (category) performed on waste prior to emplacement, and subsequent reduction in toxicity, mobility and/or volume; alternatively, if treatment is not required/performed, discuss in detail why this is equally protective, and
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7. CAMU Criteria 7

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 - Siting decisions, unit size, and closure considerations;
 - Size of the facility relative to size of contaminated soil area if waste remained in place; and
 - How consolidation of wastes (into) one location minimizes contaminated land area.

VIII. Conclusion

- A. Evaluation of Proposed CAMU Suitability Relative to CAMU Designation Criteria
- * May reference/summarize attachments

LIST OF ATTACHMENTS

- A. Siting Study
- B. 200 Area Hydrogeologic Report
- C. ERSDF Engineering Design Study (see detailed outline)
- D. Evaluation of ERSDF Designs Relative to CAMU Criteria (see detailed outline)
- E. Other Applicable Reports (i.e., Hanford Barrier Reports, Modeling Study Results)

ATTACHMENT C

HANFORD ENVIRONMENTAL RESTORATION STORAGE AND DISPOSAL FACILITY (ERSDF) ENGINEERING DESIGN STUDY IN SUPPORT OF THE CORRECTIVE ACTION MANAGEMENT UNIT PERMIT MODIFICATION REQUEST

OUTLINE

1.0 INTRODUCTION

1.1 Background

- This section will provide a brief overview of the Hanford facility, and an introduction to the Environmental Restoration Storage and Disposal Facility (ERSDF), focusing on it's purpose.
- The regulatory requirements for the ERSDF will be reviewed, and the Corrective Action Management Unit (CAMU) concept and regulations promulgated February 16, 1993 discussed.
- This section will describe the approach used for the design study, stating that although CAMU is a RCRA unit/regulation, a CERCLA-based evaluation approach was selected. It will use CERCLA-based procedures to determine the optimal ERSDF design(s), which will then be evaluated against CAMU selection criteria to determine the ERSDF design(s).
- In part, this section will explain the need for early planning and approval decisions for the ERSDF in order to fit the 2-year DOE budget approval process and to provide basic disposal facilities for 100 Area remediation wastes (with removal beginning in 1997).

1.2 Purpose and Organization of Design Study

- The purpose of the Design Study will be discussed, stating that it will develop and evaluate various alternatives for the design of the ERSDF using a CERCLA approach, which will ultimately be evaluated relative to the requirements for a CAMU under RCRA (Attachment D). Although the primary purpose of an FS-related remedial alternatives/design study is typically to provide relevant information that decision makers may use to select a remedial action, the focus of this design study will be to evaluate and screen various disposal designs for the ERSDF. Ground-water monitoring for the unit is discussed in the permit modification request.

- The organization of the Design Study will then be presented.

2.0 SITE-SPECIFIC INFORMATION

2.1 Origin and Nature of ER Wastes to be Managed in the ERSDF

- This section will provide a generalized overview of waste management within each Area at Hanford which will generate ER waste during site remediation. The information presented here will be taken from existing Hanford environmental restoration reports. A description of the five generalized waste categories will also be presented. The discussion will include anticipated contaminants and generalized contaminant levels or ranges for each waste category.
 - A:Low Activity Wastes
 - B:Low Activity Subsidable Wastes
 - C:Lower Hazard RCRA and Lower Hazardous Low Activity Mixed Wastes
 - D:High Activity Wastes
 - E:Higher Hazard RCRA and Higher Hazard High Activity Mixed Wastes

2.1.1 100 Area

-A brief description of past practices and the nature and estimated extent of contamination for the 100 Area will be presented in this section.

2.1.2 200 Area

- A brief description of past practices and the nature and estimated extent of contamination for the 200 Area will be presented in this section.

2.1.3 300 Area

- A brief description of past practices and the nature and estimated extent of contamination for the 300 Area will be presented in this section.

2.2 Environmental Restoration, Storage, and Disposal Facility (ERSDF)

- A brief discussion of the ERSDF will be presented, assuming that remediation wastes from all three areas at the Hanford facility will be disposed of in the ERSDF. It is also assumed that all wastes disposed of at the ERSDF will be classified as one of the five waste types.
- The discussion will also introduce the concept of Remedial Action Objectives (RAOs) relative to CERCLA, MTCA, and RCRA, but will state that establishment of clean-up objectives for each operable unit or aggregate area was not part of the ERSDF design evaluation.

3.0 DENTIFICATION AND SCREENING OF TECHNOLOGIES

- This section shall describe, generally, those actions (general response actions) that will satisfy the ERSDF objectives. For example, CERCLA guidance includes evaluation of a "no-action" alternative, and this section shall discuss how this alternative was evaluated and then disallowed because it was not an appropriate remedial action for Hanford.
- This section shall include identification and screening of technologies (treatment/disposal), evaluation of technologies, and, finally, the selection of representative technologies that are applicable to the five waste types at the Hanford facility. The section shall emphasize that the design of the ERSDF must be based upon the basic nature of the wastes to be managed.

3.1 Identification and Screening of Remedial Technology Types and Process Options

- The universe of technologies/options will be discussed and the +10,000 alternatives introduced. A representative 3-dimensional matrix will show potential combinations of Volume Reduction processes (X-axis) with other treatment technologies (Y-axis), for each waste type (Z-axis), and relate each treated waste type to potential disposal unit designs may be presented.

- This section will then reduce the universe of potentially applicable technology types and process options to those options that are technically feasible for the Hanford facility.

3.2 Evaluation of Technology Types and Selection of Representative Options

- In this section, the various disposal design options will be discussed and evaluated, in combination with generalized treatment technologies (i.e. volume reduction vs. no volume reduction). Options will be evaluated, and representative options selected which are Hanford-specific.

4.0 IDENTIFICATION AND SCREENING OF ALTERNATIVES

- This section will identify alternatives for each waste type and evaluate the alternatives based on the screening criteria presented in this section. The following assumptions will govern the identification and screening of alternatives:
 - The universe of remedial wastes at Hanford can be subdivided into the five waste categories presented in Section 2.1, and the remedial action alternatives for each category are evaluated independent of the remedial action alternatives for other waste types.
 - Variations within a waste category that would affect the remedial action alternatives are limited to Soil vs. Debris for waste categories A and D (radionuclides only), with an additional distinction between Organic and Metal contaminants for mixed wastes C and E. Compactable waste code B may be "soft" (plants, etc.) or "hard" (piping, etc).

4.1 Development of Alternatives

- Based upon the Screening Matrix and evaluations performed in previous sections of the Design Study, a second multi-dimensional matrix will then be developed, displaying treatment technologies (including volume reduction), disposal technologies (cap and barrier), and waste types, which will demonstrate the range of remedial alternatives that are possible at the Hanford facility.
- The matrix will likely present the 14 alternatives selected for evaluation: 6 for Waste Category E, 6 for Waste Category C, and 2 for Waste Type 1. The section will describe why no alternatives were evaluated specific to Waste Category B or D (because these would be identical to alternatives for Waste Categories A and E, respectively).

4.2 Modeling of Alternatives

- This section shall state that although a typical CERCLA-based assessment includes further screening of alternatives after the technologies are identified and initially screened, the technical effectiveness of the range of proposed alternatives relative to the ERSDF will instead be evaluated via risk-based modeling. The result of the modeling will be used to further screen the alternatives, and used during more detailed Analysis of Alternatives relative to CERCLA criteria (Section 5.0).
- This section will discuss the ground-water modeling that was performed to evaluate each of the 14 alternatives, as presented in Table 1. An attachment presenting the modeling study will be referenced.

4.2.1 Modeling Assumptions

- The discussion will present modeling assumptions and conditions:
 - Information concerning site geology is necessary to determine some model input parameters, including summary of hydrogeologic input parameters.
 - The proposed modeled Points of Compliance are: the bottom of the unit/trench; the outer edge of the "shadow" of the unit in the vadose zone immediately above the water table; and the boundary of the facility.
 - Modeling to be performed for each of the 14 cases, assuming the three proposed points of compliance, for a total 42 cases.
 - Risk assessment data/results achieved through modeling, and evaluated risk relative to groundwater only. It is assumed that water immediately below the unit and within the vadose zone was available for human consumption. Risk is evaluated

TABLE 1. WASTE, DESIGN, AND TREATMENT ALTERNATIVES FOR THE ERSDF

| Case No. | Volume Red./Soil Washing | Waste Type | Liner/ Unit Design | Barrier/ Cap | Treatment |
|-------------|--------------------------------|------------|--------------------------|-----------------|--------------------|
| 1 | N | E | None | None | N |
| 2 | N | . E | None | Hanford | · N |
| 3 | N | E | MTR | RCRA | N |
| 4 | N | Е | Single | RCRA | N |
| 5 | N | Е | MTR | RCRA | Grout |
| 6 | N | Е | None | None | Vitrifica- tion |
| 7 | N | С | None | None | N |
| 8 | Y | С | None | Hanford | N |
| 9 | N | С | MTR | RCRA | Grout |
| 10 | Y | C | None | None | Vitrifica- tion |
| 11 | N | С | Single | Hanford | N |
| 12 | Y | С | Single | Hanford | Grout |
| 13 | N | , A | None | None | N |
| 14 | Y | A | Vault | RCRA | Vitrifica- tion |

at the three points of compliance. The assumed risk standard is 10^6 .

- Modeling to be performed over a 10,000 year time period.
- Access to the 200 area will be restricted in perpetuity.
- The following constituents are to be modeled:
- Uranium
- Strontium
- Hexavalent Chromium
- Trichloroethylene
- PCBs
- Plutonium
- In cases where soil washing (or other types of volume reduction) is utilized, it is assumed that the volume of waste is reduced to 20% of the original volume (assume a 5:1 volume reduction).
- A summary of constituent concentrations (source terms) used during modeling will be determined. A 2X safety factor relative to concentration will be used (the safety factor will be applied to concentrations determined after volume reduction).
- A standard trench configuration (depth/width) will be used for lined/unlined trenches.

4.2.2. Modeling Codes and Implementation

- This will include a discussion of the modeling codes used, implementation, etc.

4.2.3 Modeling Results: Waste Type A

- 4.2.2.1 Alternative 1
 - -- Description
 - -- Evaluation of risk at POC
 - -- Cost

4.2.2.x Alternative X

- -- Description
- -- Evaluation
- -- Cost

4.2.3 Modeling Results: Waste Type C

- Same as above

4.2.4 Modeling Results: Waste Type E

- Same as above
- 4.3 Discussion of Modeling Results and Alternatives Recommended for Detailed Analysis
 - It is possible that modeling results will show that some alternatives should not be considered. These will be removed from the assessment, and detailed analysis performed for the remaining alternatives.

5.0 DESIGN REFINEMENT

- Additional refinement of the alternatives may be necessary, requiring more design/treatment alternative development and modeling iterations. Refinements will be discussed in this section.
- Phase 2,3, etc. iterations.

6.0 DETAILED ANALYSIS OF ALTERNATIVES

- This section will introduce Alternative Analysis based on CERCLA criteria.

6.1 Evaluation Criteria

- CERCLA guidance has nine criteria for evaluation during the detailed analysis of alternatives. The proposed ERSDF unit design(s) will be evaluated relative to how they meet CERCLA criteria. A description of the evaluation criteria is presented below.
 - Overall Protection of Human Health and the Environment--This criterion draws on evaluations of other evaluation criteria, in particular, long- and short-term effectiveness and compliance with regulatory requirements. This criterion provides for consideration of whether an alternative has any unacceptable short-term consequences.
 - Compliance with ARARs--This criterion includes the potential for an alternative to meet the chemical-, action-, and location-specific ARARS.

In this case, a discussion of how the alternative "fits" CERCLA as well as RCRA requirements will be presented.

- Long-term Effectiveness and Permanence--This criterion allows consideration of the risk remaining at a site (or, in this case, the ERSDF disposal unit) after the remedial action is complete. The remaining risk may include risk associated with untreated waste or residuals from treatment. The adequacy and reliability of controls (e.g., containment systems) used to manage untreated waste or residuals from treatment are also assessed.
- Reductions in Toxicity, Mobility, and Volume through Treatment— This criterion addresses the following:
 - treatment processes used and materials treated;
 - quantities of hazardous materials destroyed or treated;
 - expected percentage reduction in toxicity, mobility, and volume:
 - degree to which treatment is irreversible; and
 - type and quantity and quantity of residuals remaining after treatment.
- Short-term Effectiveness--This criterion considers the impacts on human health and the environment of the alternative during the construction and implementation phase of the remedial action (construction of the ERSDF). The following factors are addressed:
 - protection of community during remedial actions;
 - protection of workers during remedial actions;
 - environmental impacts during remedial actions; and
 - time requirements to achieve RAOs.
- Implementability--This criterion considers the technical and administrative feasibility and availability of services and materials. The factors addressed include:
 - feasibility of construction and operation (of the ERSDF);
 - reliability of the technology;
 - ease of carrying out additional remedial action, if needed;
 - ability to monitor effectiveness of remedial actions (unit design);
 - activities needed to coordinate with other offices and agencies;
 - availability of required equipment and specialists;

- availability of required materials and services;
- availability of prospective technologies;
- Cost--This criterion includes a detailed assessment of the costs for each alternative. This criterion includes consideration of the following:
 - direct capital costs;
 - indirect capital costs;
 - O&M costs; and
 - present worth analysis.
- State Acceptance--This criterion will be evaluated after submittal to appropriate agencies, but can be gauged during interactive meetings.
- Community Acceptance--This criterion will be evaluated during and after the public review process.

6.1.1 Waste Type A

6.1.1.1 Alternative 1

- Description
- Evaluation
 - overall protection of human health and the environment
 - compliance with ARARs
 - long-term effectiveness and permanence
 - reductions in toxicity, mobility, and volume through treatment
 - short-term effectiveness
 - implementability
 - cost

6.1.1.x Alternative X, same as above

6.1.2 Waste Type C

- Same as above

6.1.3 Waste Type E

- Same as above

6.4 Comparative Analysis

- The options within each waste category will be ranked relative to how they "fit" CERCLA criteria.

7.0 RECOMMENDATIONS

- The top alternatives from the design evaluation presented in Section 6 will be identified for each waste type. If different, a ranking of the alternatives with respect to the evaluation will be presented. Recommendations on the best option for meeting both the design requirements will be presented.

ATTACHMENT D

CORRECTIVE ACTION MANAGEMENT UNIT (CAMU) EVALUATION

- The introduction will state that the CAMU evaluation will draw largely from the technical information presented in Sections 5.0, 6.0, and 7.0 of Attachment C, as well as the other attachments, and the permit modification request (as applicable). The purpose of this Attachment is to document how ERSDF design alternatives for specific waste categories will meet the CAMU selection criteria. A detailed description of each criterion will be presented. Following a description of the criterion, alternatives (for each waste type) will be evaluated for compliance with the criterion. This section is currently organized for a comparative analysis of each alternative within a waste type for each criterion, but it is possible to present each alternative (for each waste type) and discuss all seven criteria similar to the presentation in Section 5 of Attachment C.
- The seven evaluation criteria will then be discussed.

1.0 Criterion No. 1

- Description: The CAMU shall facilitate the implementation of reliable, effective, protective, and cost-effective remedies
- 1.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative X
- 1.2 Comparative Analysis--Waste Type C
 - Same as above
- 1.3 Comparative Analysis--Waste Type E
 - Same as above

2.0 Criterion No. 2

- Description: Waste management activities associated with the CAMU shall not create unacceptable risks to humans or the environment resulting from exposure to hazardous wastes or hazardous constituents.

- 2.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative x
- 2.2 Comparative Analysis--Waste Type C
 - Same as above
- 2.3 Comparative Analysis--Waste Type E
 - Same as above

3.0 Criterion No. 3

- Description: The CAMU shall include uncontaminated areas of the facility, only if including such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility.
- 3.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative x
- 3.2 Comparative Analysis-Waste Type C
 - Same as above
- 3.3 Comparative Analysis--Waste Type E
 - Same as above

4.0 Criterion No. 4

- Description: Areas within the CAMU, where wastes remain in place after closure of the CAMU, shall be managed and contained so as to minimize future releases, to the extent practicable.
- 4.1 Comparative Analysis--Waste Type A
 - Alternative 1

- Alternative 2
- Alternative x
- 4.2 Comparative Analysis--Waste Type C
 - Same as above
- 4.3 Comparative Analysis--Waste Type E
 - Same as above

5.0 Criterion No. 5

- Description: The CAMU shall expedite the timing of remedial activity implementation, when appropriate and practicable.
- 5.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative x
- 5.2 Comparative Analysis--Waste Type C
 - Same as above
- 5.3 Comparative Analysis--Waste Type E
 - Same as above

6.0 Criterion No. 6

- Description: The CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance long-term effectiveness by reducing toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU.
- 6.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative x
- 6.2 Comparative Analysis—Waste Type C

- Same as above
- 6.3 Comparative Analysis--Waste Type E
 - Same as above

7.0 Criterion No. 7

- Description: The CAMU shall to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the CAMU.
- 7.1 Comparative Analysis--Waste Type A
 - Alternative 1
 - Alternative 2
 - Alternative x
- 7.2 Comparative Analysis--Waste Type C
 - Same as above
- 7.3 Comparative Analysis--Waste Type E
 - Same as above

8.0 Conclusions from CAMU Evaluation

- A summary of the CAMU evaluation will be discussed, presenting how each alternative meets/doesn't meet CAMU criteria. The CAMU evaluations will help determine ERSDF unit design(s).

ERSDF/TREATMENT ENGINEERING SCREENING EXERCISE

M. R. ADAMS WESTINGHOUSE HANFORD COMPANY ENVIRONMENTAL RESTORATION ENGINEERING

MAY 1993

OBJECTIVES OF EXERCISE

- To informally screen various combinations of barrier/liners/treatment using available models.
 - Develop initial indications of performance in terms of risk for further discussion.
- Use results to assist in narrowing alternatives to be more fully/formally addressed in CDR and/or in permitting/regulatory process.
- Compare "Baseline" (e.g., MTR configuration/treated waste) with others.

OBJECTIVES OF EXERCISE (Continued)

- Detect promising configurations on a relative basis.
 - Maximum risk at various boundaries at known times.
 - Relative cost per disposal unit.

THE OBJECTIVE IS NOT

- To make decisions outside the prescribed Tri-Party Agreement process.
- To input to any formal permit, Remedial Investigation/Feasibility Study, or design document(s) unless all parties agree it would be useful.
- To bind any party to a course of action or commitment.
 - However may be useful in making decisions by all parties.

INITIAL MATRIX OF ALTERNATIVES

- These will get us started; others may be added as a result of this meeting.
- 10,780 combinations of waste codes (5), waste types (2), waste constituents (2), treatment technologies (7), disposal methods (7), and volume reduction methods (11) existed on screening chart used.
- Boiled down to 14 cases for initial model runs.
 - Others can be added as desired.

MATRIX OF INITIAL CASES SELECTED

| CASE | WASH | WASTE CODE | LINER | BARRIER | WASTE FORM |
|------|------|---------------|--------|---------|---------------|
| 1 | NO | E | NO | NO | NO |
| 2 | NO | E | NO | HANFORD | NO |
| 3 | NO | Е | MTR | RCRA | NO |
| 4 | NO | E | SINGLE | RCRA | NO |
| 5 | NO | E | MTR | RCRA | GROUT |
| 6 | NO | E | NO | NO | VIT |
| 7 | NO | С | NO | NO | NO |
| 8 | YES | С | NO | HANFORD | NO |
| 9 | NO | С | MTR | RCRA | GROUT |
| 10 | YES | С | NO | NO | VIT |
| 11 | NO | С | SINGLE | HANFORD | NO |
| 12 | YES | С | SINGLE | HANFORD | GROUT |
| 13 | NO | Α | NO | NO | NO |
| 14 | YES | Α | VAULT | RCRA | VIT |

INITIAL MATRIX OF ALTERNATIVES (Continued)

- Cases selected allow initial look at impact on cost/risk reduction of:
 - Wash versus no wash (volume reduction)
 - Waste Code: E High activity mixed RCRA

A - Low activity

C - Low activity lower hazard mixed RCRA

- Liner:
 - -- None
 - -- Single
 - -- MTR
 - -- Concrete Vault

INITIAL MATRIX OF ALTERNATIVES (Continued)

- Barrier:
 - -- RCRA
 - -- Hanford
 - -- None
- Waste Form Treatment:
 - -- None
 - -- Grout
 - -- Vitrified

MATRIX OF INITIAL CASES SELECTED (Continued)

- Each of 14 cases will be examined at three (3) compliance boundaries:
 - 1) Bottom of trench.
 - 2) Top of groundwater table.
 - 3) In groundwater at shadow boundary.
- Six constituents will be examined (vary in mobility):
 - U
 - PCBs
 - Cr
 - Sr
 - TCE
 - Pu

MATRIX OF INITIAL CASES SELECTED (Continued)

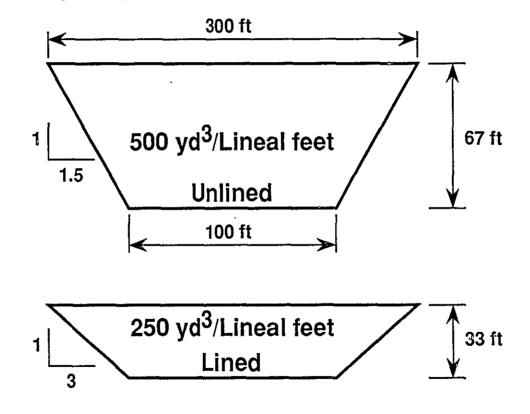
- Maximum risk (10⁻⁶ departure point of possible acceptability) will be determined.
- Risk determined at each boundary and time stated (up to 10,000 years).
- Source term will be typical 100/300 Area concentrations (x2 safety factor).
- Standard trench configurations assumed for exercise.
- Models used include 1-D screening calculation with VAM-2D for selected cases to calibrate.
- Geology used is best available for facility location.

MATRIX OF INITIAL CASES SELECTED (Continued)

- Pathway examined is groundwater.
- Exercise will allow sensitivities to important parameters be explored.
 - Range of costs.
 - Range of protectiveness for combinations of waste code, barrier, waste form, liner.
 - Range of deviation from MTR "Baseline" and cost/risk differential.

Trench Configurations Assumed

- This Should not be Confused with a Trench Design
- For Comparing Relative Risk/Cost for this Exercise



HOW INITIAL CASES ARE DIFFERENTIATED

Hanford Barrier 10⁻⁹ CM/SEC*

RCRA Cover 10⁻⁷ CM/SEC

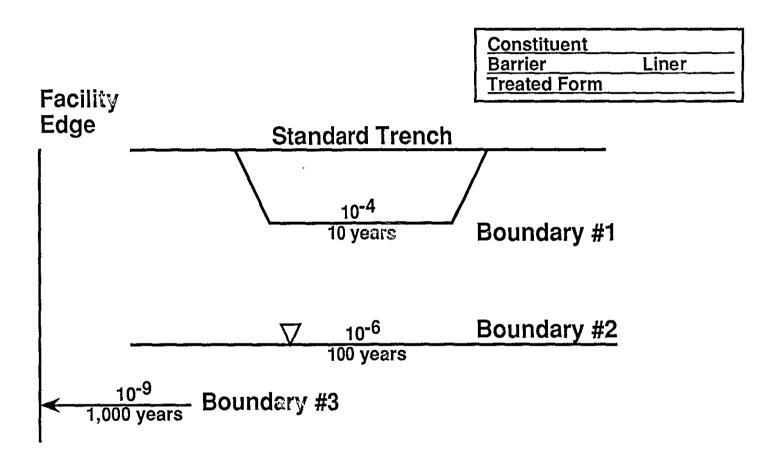
*Hold on - We know we have to prove this!

- Glass/grout by rate of deteriorization
 - Glass slower
 - Grout faster
- Wash/no wash: concentrate 5/1 (80% volume reduction)

YOU SAY - YOU'RE FAVORITE CONFIGURATION/ ASSUMPTION IS NOT HERE!!

- Not to worry.
- Additional cases can be done in additional runs.
- The blessings of modern computer science!

Format of Model Results

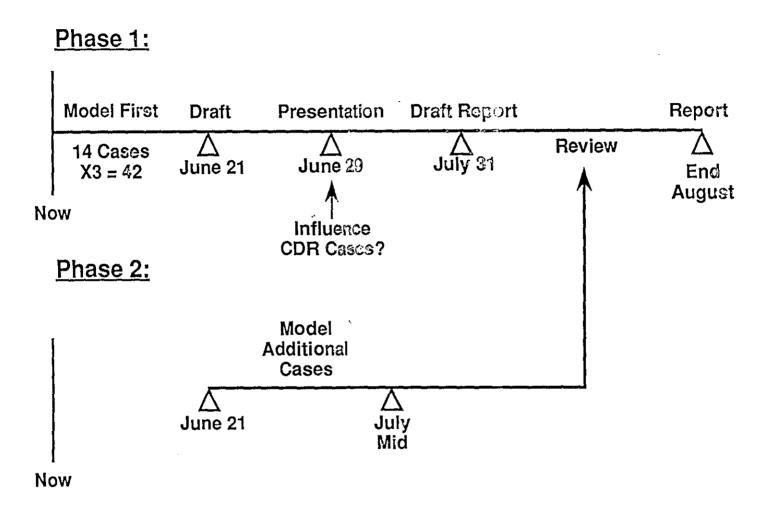


Format for Cost Results

| | Liner Barrier Treated Form |
|-----------------|----------------------------------|
| Standard Trench | → X Lineal Foot |

| Construction Cost | Operation Cost (100 years) |
|--------------------|----------------------------|
| Waste Treatment | Total |
| Liner | |
| Barrier | |
| Excavation | |
| Total | |

Schedule for Exercise



NAME PAMELA /NNIS Ted Wooley Mel Adams B.L. Focey Connie Walter Merl Lauterbach David Golfis Suzanne Clarke Hern Dronen Mul Beaver Clark Hodgi George C Evans Scott Kindud MOSES HARAYSI

ER-SDF MEETING) RGANIZATION EPA Ecology MIC DOE-RC ATKearny WHC Atkearney DAMES É MOOPE WHC Projects wtc-Projects E. COLOGY WHC RERA Pormitting Golden Econogy

MAY 11, 1993 THOME 376-4919 736-3012 6-8361 6-7087 303-572-6175 376-5257 375-5667 (Local) 703/739-1630 576-8189 376-0248 6-8665 6-0319 206 438-7556 376 8939 706-883-0777 (509) 736-3016

ENVIRONMENTAL RESTORATION - STORAGE AND DISPOSAL FACILITY (ERSDF) MEETING MINUTES

Distribution List:

Jay Augustenborg - DOE-RL/WMD Suzanne Clarke - Dames & Moore Michael Collins - DOE-RL/PMD Audree DeAngeles - PRC Vern Dronen - WHC Julie Erickson - DOE-RL/ERD Carrie Sikorski/Cathy Massimino - EPA Region 10 Bryan Foley - DOE-RL/ERD Jim Goodenough - DOE-RL/ERD George Hofer - EPA Region 10 Mark Janaskie - DOE-HQ Merl Lauterbach - WHC Toby Michelena/Richard Hibbard - Ecology, Lacey Dave Nylander/Moses Jaraysi - Ecology, Kennewick Ann Price/Dave Fagan - EPA Headquarters Fred Roeck - WHC Ward Staubitz - USGS Darci Teel/Ted Wooley - Ecology, Kennewick

EPA ERSDF File

Administrative Record = ER Storage and Disposal Facility (ERSDF)